Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

INTERACTIVE MISSILE DESIGN—MANUFACTURING NETWORK ACCELERATES SPIRAL DEVELOPMENT TIMES FOUR

The Interactive Missile Design/Web-based Design Environment (IMD)/(WDE) system offers significant and invaluable savings in design time and cost. This dynamic real-time design environment optimizes the process by collaborating users such as military customers, industry designers, and manufacturers. The IMD/WDE system saved Lockheed Martin Missiles and Fire Control (LMMFC) more than $3 million to date, just in the conceptual missile design process alone.

Future payoffs include the Supersonic/Hypersonic Vehicle Design Simulation system, which is a similar Web-based, conceptual design environment for high-speed vehicles. Much like the missile design environment, engineers can design these vehicles four times faster than in previous design processes and analyze the design for quick turnaround in what-if scenarios.

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Accomplishment

LMMFC of Orlando, Florida, under a contract with the Manufacturing Technology (ManTech) Division of the Materials and Manufacturing Directorate, developed an interactive design-manufacturing network for missiles, referred to as the IMD system. IMD, often referred to as "spiral development," helps engineers perform missile design up to four times faster than previous design systems.

LMMFC uses the IMD software to integrate multiple design disciplines with both residual and supplier manufacturing knowledge to perform an integral role in the preliminary and conceptual missile design process. Recent LMMFC projects in which IMD significantly reduced design time for the Air Force and Army include the Extended Range Javelin, Common Modular Missile, Advanced Fire Support system, Precision Attack Munitions, and Multi-Role Armament and Ammunition systems.

Background

The IMD system is an application based upon the commercially available Adaptive Modeling Language (AML), created by TechnoSoft Inc. of Cincinnati, Ohio. Using AML as the underlying architecture, IMD is a cross-platform, multi-disciplinary design system that integrates system-level missile design and analyses with cost estimation.

The IMD system has the ability to analyze cost and performance trade-offs that are necessary for cost-as-an-independent-variable studies. This analysis significantly reduces conceptual and preliminary design time, which, in turn, reduces overall program cycle time. This reduction in program cycle time leads to reductions in overall cost and time to market.

IMD is an even more powerful design tool when enhanced with TechnoSoft's real-time Internet-based collaborative design extension, known as WDE. ManTech, the Air Vehicles Directorate, and Lockheed Martin originally developed the WDE software under a Dual-Use Science and Technology contract.

The IMD/WDE integration allows for the interaction of many geographically dispersed designers and analysts working on the same WDE server-based model. The collaboration of these dispersed engineers and designers to work together, from the initial design concept to a virtual prototype, significantly saves valuable design time. Additionally, the IMD/WDE incorporates subcontractors, teammates, suppliers, manufacturers, and customers into the design process to offer design input.

For more information on IMD, contact the Technology Information Center at (937) 255-4689.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (02-ML-16)

Materials and Manufacturing
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